ACCESSION #: 9611260192
LICENSEE EVENT REPORT (LER)

FACILITY NAME: H. B. ROBINSON STEAM ELECTRIC PAGE: 1 OF 4
PLANT, UNIT NO. 2

DOCKET NUMBER: 05000261

TITLE: AUTOMATIC INITIATION OF RPS DUE TO STEAM GENERATOR FEEDWATER LEVEL CONTROL SYSTEM FAILURE

EVENT DATE: 10/20/96 LER #: 96-007-00 REPORT DATE: 11/19/96

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 20

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(2)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: H. K. Chernoff, Manager - TELEPHONE: (803) 857-1437
Licensing/Regulatory Programs

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: JB COMPONENT: FRV MANUFACTURER: W120
REPORTABLE NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:
On October 20, 1996, H.B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2 was in power ascension following startup from Refueling Outage 17, and was operating at 20 percent reactor power. An automatic reactor trip occurred at 1337 hours following a rapid increase in demand for the "B" Steam Generator (SG) level and feedwater flow, and a subsequent SG overfeed condition. Plant systems functioned as expected, and plant operators stabilized the reactor at zero percent power and hot shutdown conditions using Emergency Operating Procedures (EOPs). Although the root cause of this event could not be conclusively determined, based on industry data and the maintenance history for the "B" SG Feedwater Regulating Valve (FRV) manual/automatic control station, equipment aging is the most likely cause of this event. Although the failure of the "B" SG FRV manual/automatic control station resulted in an automatic actuation of the Reactor Protection System (RPS) and a plant transient, this event has minimal safety significance. The "B" SG FRV manual/automatic control station was replaced on October 21, 1996, and the plant was placed back on line. Licensed Operators will review this event by

December 31, 1996, during Cycle 6 of the Licensed Operator Training program. This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv).

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I. DESCRIPTION OF EVENT

On October 20, 1996, H. B. Robinson Steam Electric Plant (HBRSEP), Unit 2 was in power ascension following startup from Refueling Outage 17, and was operating at 20 percent reactor power. The three Steam Generator (SG) Feedwater Regulation Valves (FRVs) (EIIS Component Code: FCV) were in the automatic operation mode to control feedwater flow to their respective SGs. At approximately 1335 hours Eastern Daylight Time, a rapid increase in demand occurred for the "B" SG level and feedwater flow. Upon observing a rapid increase in flow demand for the "B" SG FRV and the potential for a SG overfeed condition, a licensed Control Room operator took the immediate actions of procedure Abnormal Operating Procedure (AOP)-010, "Main Feedwater/Condensate Malfunction." The operator placed the "B" SG FRV controller (EIIS Component Code: FIK) in manual control and the FRV was driven in the closed direction to match the "B" SG feed flow and steam flow in an attempt to prevent a SG overfill condition and subsequent turbine trip. However, the position demand for the "B" FRV continued to increase, and the amount of water introduced into the "B" SG by the FRV resulted in a swell of water in the "B" SG of sufficient magnitude to reach the SG high water level trip, followed by a turbine trip and a trip of the Main Feed Pumps (MFP) (EIIS System Code: BA). The turbine trip caused an automatic reactor trip at 1337 hours. Plant systems functioned as expected, and plant operators stabilized the reactor at zero percent power and hot shutdown conditions using Emergency Operating Procedures (EOPs). The NRC was notified of this event on October 20, 1996, at 1427 hours Eastern Daylight Time via the Federal Telephone System (FTS) in accordance with 10 CFR 50.72(b)(2)(ii) as an event that resulted in the automatic actuation of the Reactor Protection System (RPS) (EIIS System Code: JC).

II. CAUSE OF EVENT

The root cause of this event could not be conclusively determined. A review of maintenance history for the SG FRV manual/automatic control stations identified previous occurrences when the controllers have failed to operate properly to control SG level. Equipment aging was identified as a causal factor for these occurrences, and several components in the FRV control system have since been replaced to reduce the potential for improper valve to control. The most recent occurrence was found during Refueling Outage 17 when scheduled equipment calibration was being performed. The equipment was subsequently repaired and satisfactorily returned to service. During the investigation of the October 20, 1996, event, plant Maintenance personnel performed calibrations and visual checks of the SG water level control system to identify any input signal that could cause the "B" SG FRV to move to the full-open position. These calibrations and checks demonstrated normal indications and responses. Based on industry data that similar controllers have previously failed to operate properly to control SG level, and the maintenance history for the SG FRV manual/automatic control station that identified previous occurrences when the controllers have failed to adequately control SG level, equipment aging is the most likely cause of this event.

III. ANALYSIS OF EVENT

The operational transient associated with this event began when an automatic turbine and subsequent reactor trip occurred as a result of increase in demand for the "B" SG FRV and a SG overfeed condition. Although the failure of FRV resulted in an automatic actuation of the RPS and plant transient, this event has minimal safety significance. The basis of Technical Specifications (TS) Section 3.1.1.2 states that one SG capable of performing its heat transfer function will provide sufficient heat removal capability to remove core decay heat after a normal reactor shutdown. With the failure of the "B" SG FRV, normal flow controls remained available to two of the three SGs, and normal flow controls were available to the "B" SG when SG level decreased below the high level trip setpoint. Also, the Auxiliary Feedwater system was available to supply any or all of the three SGs. Therefore, the ability to remove decay heat using the secondary heat sink remained available.

The Updated Final Safety Analysis Report (UFSAR) addresses postulated transients and accidents which could result in a reduction in the capacity of the secondary system to remove heat generated in the Reactor Coolant System (RCS). One of these postulated transients, Feedwater System Malfunctions that Result in an Increase in Feedwater Flow, is addressed in UFSAR Section 15.1.2. The primary challenge of this transient is an increase in heat removal capacity, and as a cooldown event, it is most limiting at end of cycle when the moderator temperature coefficient is most negative. The UFSAR accident analysis bounds this event by the results of the 10 percent load increase event (i.e., Chapter 15.1.3) and the insertion rate used in the rod withdrawal event at subcritical or low power (i.e., Chapter 15.4.1). The event reported by this Licensee Event Report (LER) is less severe than the UFSAR Chapter 15.1.2 event, since it occurred at beginning of cycle. Therefore, this event had minimal effect on plant safety. This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv).

IV. CORRECTIVE ACTIONS

The "B" SG FRV manual/automatic control station was replaced on October 21 1996, and the plant was placed back on line.

Licensed Operators will review this event by December 31, 1996, during Cycle 6 of the Licensed Operator Training program.

Maintenance personnel will evaluate the necessity for preventative maintenance procedures to conduct diagnostic checks of manual/automatic control stations, and procedures will be developed accordingly by December 30, 1996.

V. ADDITIONAL INFORMATION

A. Failed Component Identification

Feedwater Steam Generator Water Level Control System (EIIS System Code: JB, Manufacturer: W120)

B. Previous Similar Events

LER 85-05

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10 CFR 50.73

CP&L
Carolina Power & Light Company
Robinson Nuclear Plant
3581 West Entrance Road
Hartsville SC 29550

Robinson File No: 135 10C
Serial: RNP-RA/96-0197

NOV 19 1996

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

DOCKET NO. 50-261/LICENSE NO. DPR-23
LICENSEE EVENT REPORT NO. 96-007-00

Gentlemen:

The enclosed Licensee Event Report (LER), is submitted in accordance with 10 CFR 50.73(a)(2)(iv). This report is required to be submitted to the NRC by November 19, 1996.

Very truly yours,

D. E. Young
Plant General Manager

Enclosure
c: Mr. S. D. Ebneter, Regional Administrator, USNRC, Region II
Ms. B. L. Mozafari, USNRC Project Manager, HBRSEP
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